Why an agroecological approach in West-Africa? Elements for a regional project

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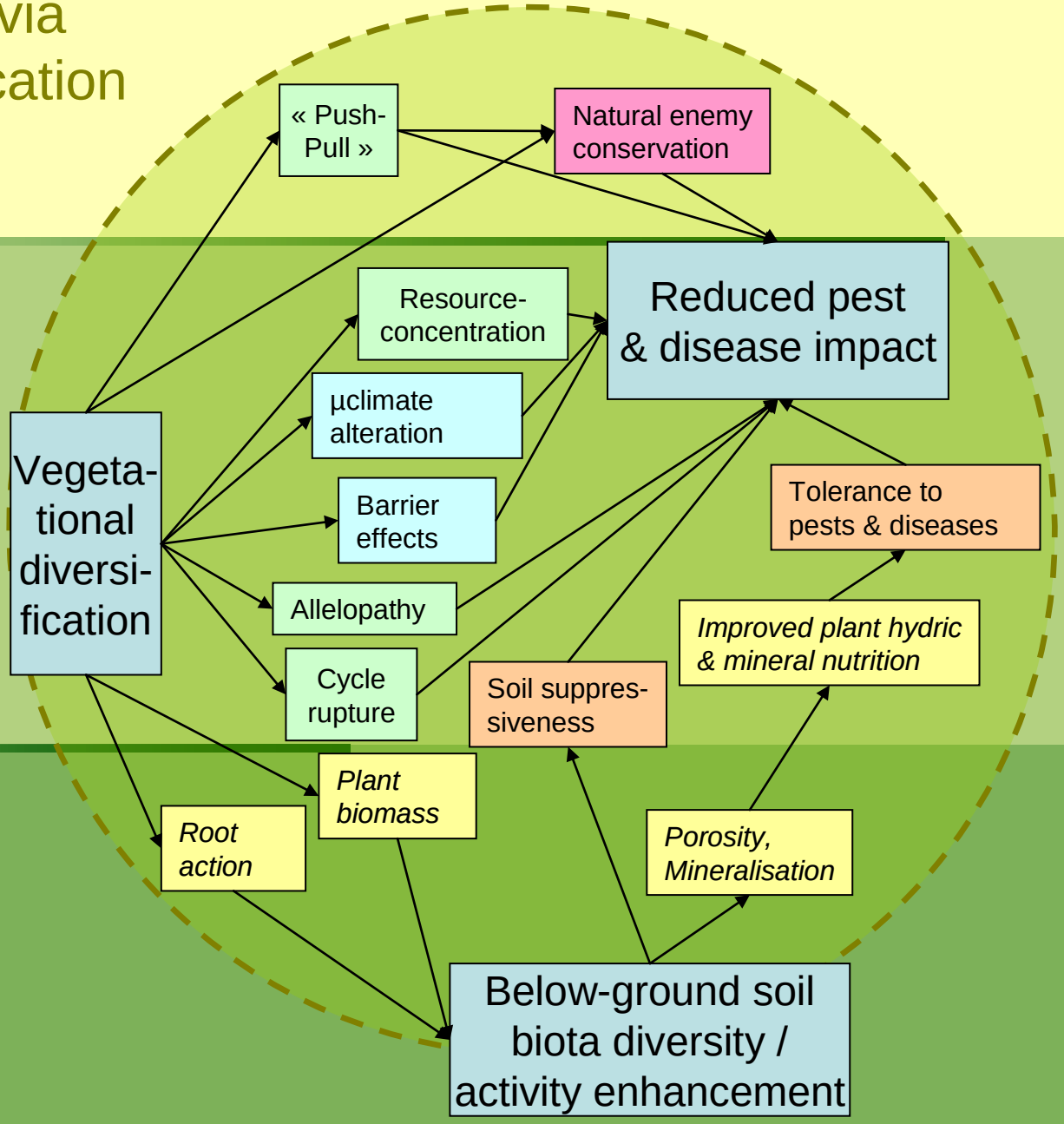
Challenges facing horticulture in W.Africa

- Vegetable and fruit growers in the tropics are faced with dramatic plant protection issues/phytosanitary risks resulting in :
  - food insecurity and low-income in low-input traditional agrosystems
  - pesticide-induced adverse impacts on human health and the environment in intensive systems (e.g. in periurban areas)
  - export restrictions due to strict regulations imposed by importing countries Re: quarantine pests and minimum pesticide residue limits

Need for a shift from Agrochemistry to Agroecology

- Setting up an ecologically intensive horticulture for tomorrow is now a major objective for providing more and better food to populations of both the southern and northern hemispheres
- The paradigm of ecological intensification is based on the optimization of biological interactions and regulations in agroecosystems
- Particularly, it is based on the planned introduction and management of plant species diversity (PSD) in agroecosystems; it may result through various pathways in pest and disease impact reduction

Agroecological pathways of pest & disease regulation via vegetational diversification in agroecosystems




Traitement en taches


Helicoverpa/Tomate


Plutella/Chou


Filets anti-insectes

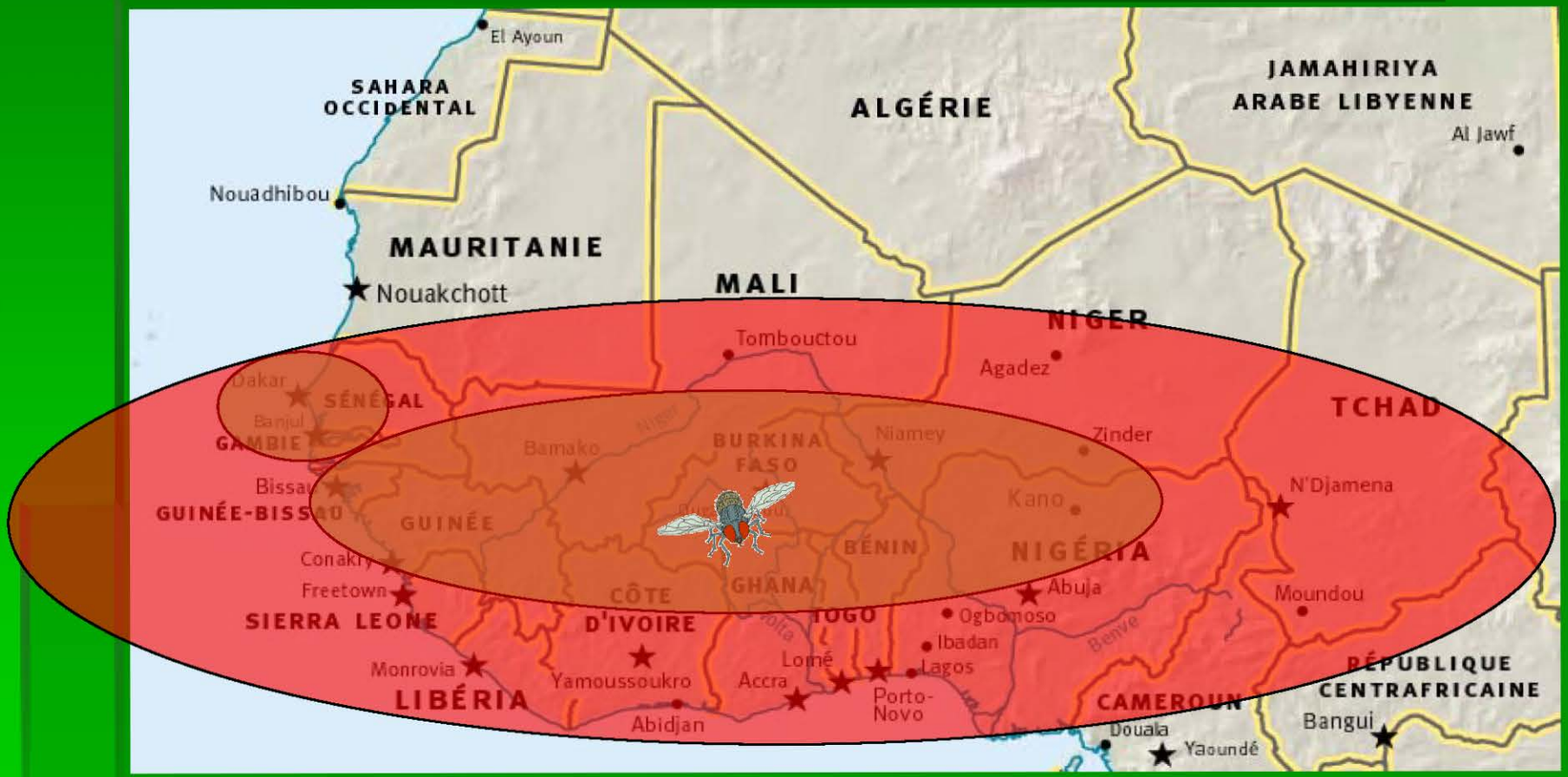

Ralstonia/Tomate

1. mango/ Bactrocera invadens / fruit fly

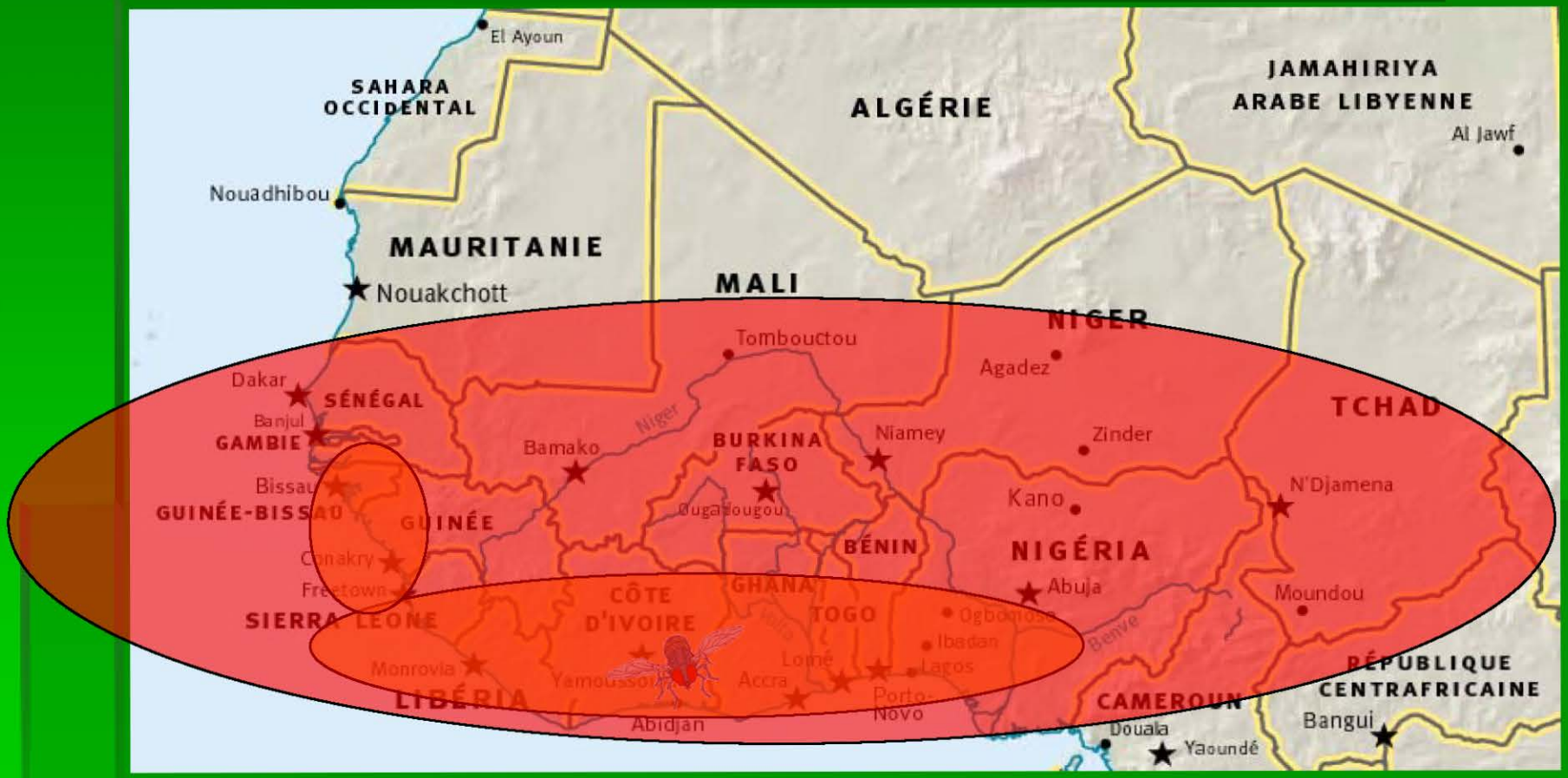
What is it?

- **Alien species:** **probably originated from India and Sri Lanka.**
- **Species highly polyphagous (targets: more than 40 species of fruit crops in Benin).**
- **Alien species with high biotic potentialities** (> than those of native species).

Central zone of mango in West Africa and distribution of Bactrocera invadens



Central zone of citrus in West Africa and distribution of B. invadens

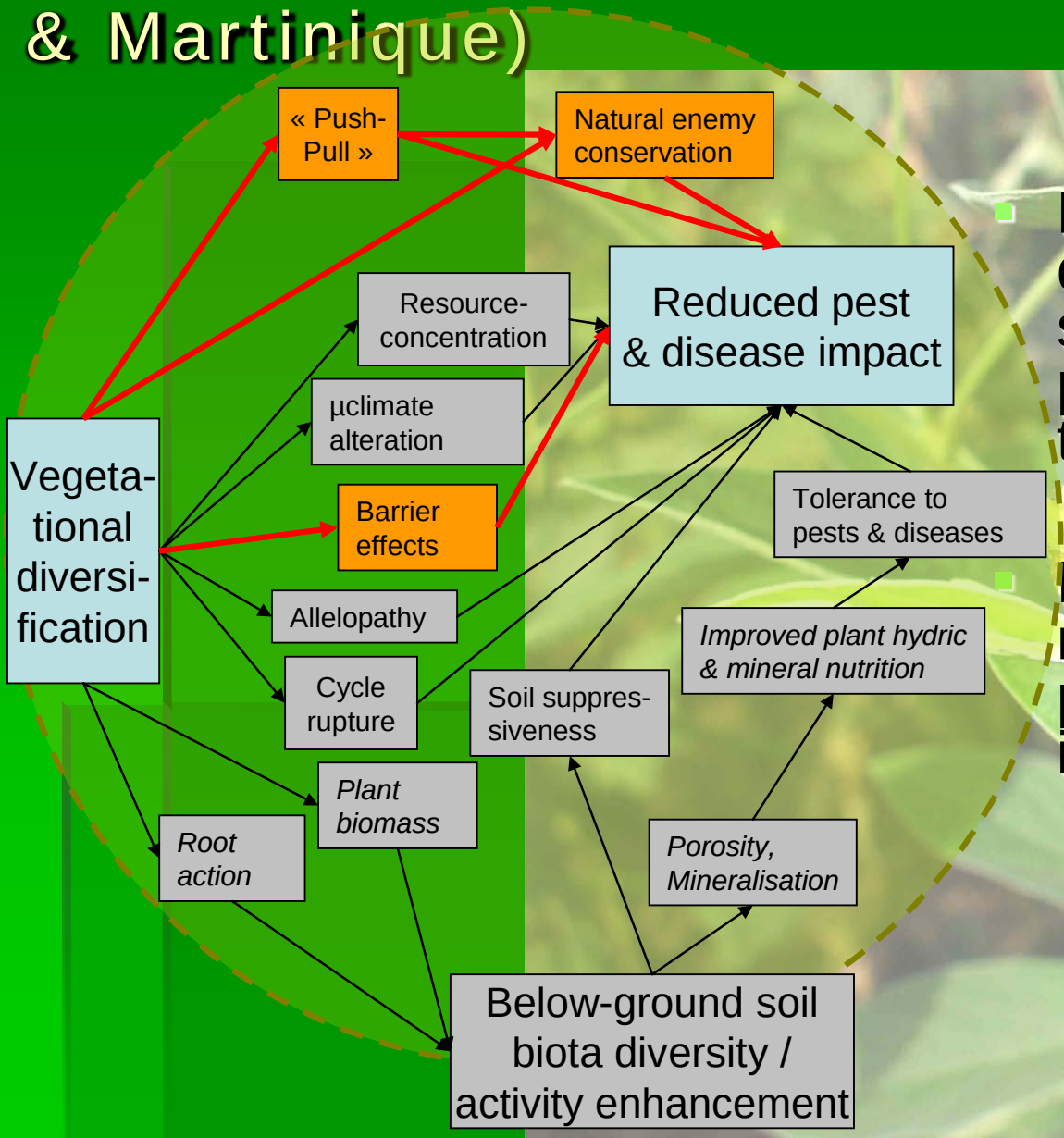


2. Optimization of trap-plant arrangements for regulating tomato fruit worm populations in "assisted push-pull" systems on tomato & okra

Another case study assesses the potential of pigeon pea and sorghum as perimeter **trap crops/barriers** for reducing infestation and damage of Tomato fruitworm (TFW) Helicoverpa armigera and Cotton whitefly (CWF) Bemisia tabaci on okra and tomato in Niger

While a parallel study was conducted in Martinique to compare the phenological stages of maize and tomato in order to select cultivars and/or adjusting sowing dates of both crops to optimize attractive and visual camouflage effects of maize vs TFW H. zea (plus barrier effect vs CWF) to protect the tomato crop

Studied effects & preliminary results (TFW & CWF in horticultural systems of Niger & Martinique)



- Helicoverpa infestation & damage to okra was significantly reduced using pigeon pea as a perimeter trap crop in Niger
- Potential barrier effect of a maize cv for tomato protection vs Bemisia infestation in Martinique

3. Determination of the conditions of soil-borne crop pest & disease management by " service " plants with direct sanitating /biocidal effects in rotation/intercrops

A case study aims at checking the hypothesis that the introduction of service plants with sanitizing/allelopathic effect managed as green manures in market gardens results in a reduction of soil infectious potential by bacterial wilt (BW) Ralstonia solanacearum

Conclusions & future prospects

- 4 case studies concerning horticultural cropping systems reported here are illustrative of the overall approach

- They concern a generalist disease and polyphagous pests with resp. low and high dispersal ability, and will provide decision rules which will help set up generic models to manage disease/pests with similar life-history traits